

TWO NEW SPECIES OF *GIGANTIONE* KOSSMANN (ISOPODA: EPICARIDEA: BOPYRIDAE) FROM THE WESTERN NORTH ATLANTIC

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Abstract.—*Gigantione mortenseni* n. sp. is described from three dromiid crabs, *Dromidia antillensis* Stimpson, *Hypoconcha sabulosa* (Herbst), and *H. spinosissima* Rathbun. *Gigantione uberlackerae* is described from an undescribed axiid species, *Axiopsis* (*Paraxiopsis*) sp.

Gigantione is a well defined taxon having several unusual characteristics reflecting the distinctiveness of *Gigantione* from other bopyrid genera. The unusual characteristics for the female of *Gigantione* are: (1) the oral cone is visible in dorsal view, (2) the maxilliped is edged with plumose setae, (3) the basal segment of the first antenna is enlarged and applied to the oral cone, (4) the coxal plates and lateral plates are pubescent, and (5) the uropods have a discrete peduncle. The male of most species has biramous pleopods and uropods. The following generic diagnosis is presented to include several of the above unusual characters.

Gigantione Kossmann

Generic diagnosis.—Female: body nearly circular in outline; distortion slight to moderate; all regions and segments distinct. Head with oral cone visible in dorsal view; anterior lamina medially narrow, usually laterally developed into lobes; basal segments of first antenna greatly enlarged and applied to oral cone; maxilliped without palp, margin at least medially fringed with plumose setae; posterior lamina, one pair of lateral projections and median projection. Coxal plates present on at least anterior pereomeres, pubescent. Dorsal bosses on pereomeres 1-4. Pleomeres 1-5 with lateral plates, lateral plates pubescent; pleomere 6 set deeply in pleomere 5. Pleopods, 5 biramous pairs; first pair larger than others with rami leaf-shaped; other pleopods digitate, decreasing in size posteriorly. Uropods biramous.

Male: all regions and segments distinct. Pleomeres usually with lateral margin directed ventrally. Pleopods, 5 pairs. Pleopods and uropods present, generally biramous.

Remarks.—In the phylogeny of the Bopyridae, *Gigantione* represents a primitive branchial form (Shiino 1952, 1965; Markham 1974). In the Bopyridae, advanced forms are characterized by the reduction in some or all of the following characters: pleopod rami reduced, number of pleopod pairs reduced, oostegites reduced, fusion of pleomeres, fusion of pereomeres. For the male, advanced forms are characterized by some or all of the following: head fused to pereomere, pleopods reduced in number or rami, pleomeres fused. Both the female and male of *Gigantione* have all regions and segments distinct, five pairs of biramous pleopods (generally biramous for males), and uropods generally biramous.

Gigantione mortenseni, new species

Figs. 1-5

Gigantione bouvieri Nierstrasz and Brender à Brandis, 1931:152-153, figs. 7-12.

Material examined.—Infesting *Dromidia antillensis* Stimpson, 1859, Gulf of Mexico. Station SAM 475-10; 30°08'N, 87°07'W; 32 m; Apr 1975; R. L. Shipp collected; D. L. Adkison determined host; 1 ♀ (immature, no male) USNM 172464.—Station MAFLA III-D(37); 29°48'N, 86°03'W; capetown dredge; 43 m; Jun 1974; T. S. Hopkins collected; D. L. Adkison determined host; 2 ♀ (both immature, no males, both from right gill chamber of same host) USNM 172461.—Bellows station 39; 28°26'N, 84°21'W; capetown dredge; 43 m; 1 Jul 1977; S. B. Collard and D. L. Adkison collected; D. L. Adkison determined host; 1 ♀ (gravid), 1 ♂ USNM 172467.—Station MAFLA II-N(49); 28°24'N, 84°21'W; 46 m; Jun 1974; T. S. Hopkins collected; D. L. Adkison determined host; 2 ♀ (1 ovigerous, 1 immature), 2 ♂ (1 juvenile) RMNHL I-5911.—Station MAFLA I-B(62); 27°50'00"N, 83°31'00"W; diver collected; 28 m; 16 Aug 1976; T. S. Hopkins collected; D. L. Adkison determined host; 1 ♀ (gravid, no male) USNM 172463.—Station EJ-65-272; 27°37'N, 83°28'W; 37 m; 31 Aug 1965; B. Presley collected; N. Whiting determined host; 1 ♀ (immature), 1 ♂ FSBC I-22928.—Station BLM 3102014; 26°24'N, 83°49'W; capetown dredge; 98 m; 15 Jul 1976; T. S. Hopkins collected; D. L. Adkison determined host; 1 ♀ (gravid), 1 ♂ ZMC.—Hourglass station L, EJ-65-347; 26°24'N, 83°22'W; 55 m; 13 Nov 1965; B. Presley collected; W. G. Lyons determined host; 1 ♀ (gravid), 1 ♂ FSBC I-22929.—Hourglass station L, EJ-65-380; 13-14 Dec 1965; H. Wahlquist collected; W. G. Lyons determined host; 2 ♀ (1 gravid, 1 juvenile), 1 ♂ FSBC I-22927.—Station BLM 15-I-A(62); 26°21'N, 82°57'W; capetown dredge; 37 m; 28 Jul 1975; T. S. Hopkins collected; D. L. Adkison determined host; 1 ♀ (gravid), 1 ♂ DISL.—Station 65-188; 25°50'N, 82°44'W; 36 m; 30 Jun 1965; E. Joyce determined host; 1 ♀ (gravid, holotype) USNM 172456; 1 ♂ USNM 172457; 2 ♀ (juvenile), 1 ♂ USNM 172458.—Station EJ-65-209; 25°29'N, 82°17'W; 27 m; 10 Jul 1965; A. Provenzano determined host; 1 ♀ (non-gravid), 1 ♂ USNM 172466.—Oregon II station 21317, 21318; 24°51'N, 82°20'W; trawl; 28 m; 15 Dec 1976; D. L. Adkison collected and determined host; 1 ♀ (non-gravid, no male) USNM 172460.—Station EJ-67-147; 24°38'N, 82°59'W; 28-33 m; 27 Apr 1967; W. G. Lyons and M. Moe collected; W. G. Lyons determined host; 4 ♀ (juvenile), 1 ♂ USNM 172462. Atlantic Ocean off Florida.—Station EJ-73-63; 27°55'N, 80°03'W; 46 m; 14 May 1973; D. Barber collected; N. Whiting determined host; 2 ♀ (1 gravid, 1 immature), 2 ♂ (1 juvenile) USNM 172459.—Yucatan Peninsula, Mexico. Station EJ-68-64; 20°03'N, 87°04'W; box dredge; 37 m; 20 Jul 1968; D. K. Camp collected; D. L. Adkison determined host; 1 ♀ (gravid), 1 ♂ USNM 172465.—Haiti; 1974; Pr. A. Veillet collected; D. L. Adkison determined host; 1 ♀ (non-gravid), 1 ♂ MNHN Ep. 114.

Infesting *Hypoconcha sabulosa* (Herbst).—North from Thatch Cay, St. Thomas, Virgin Islands; approx. 18°21'N, 64°52'W; 15 Mar 1906; T. Mortensen collected; D. L. Adkison determined host; 1 ♀ (gravid), 1 ♂ ZMC.—Station EJ-74-191; 28°37'N, 80°11'W; 40 m; 14 Oct 1974; D. Barber collected; R. H. Gore determined host; 1 ♀ (immature), 1 ♂ USNM 172468.

Infesting *Hypoconcha spinosissima* Rathbun.—Station MAFLA III-D(37);

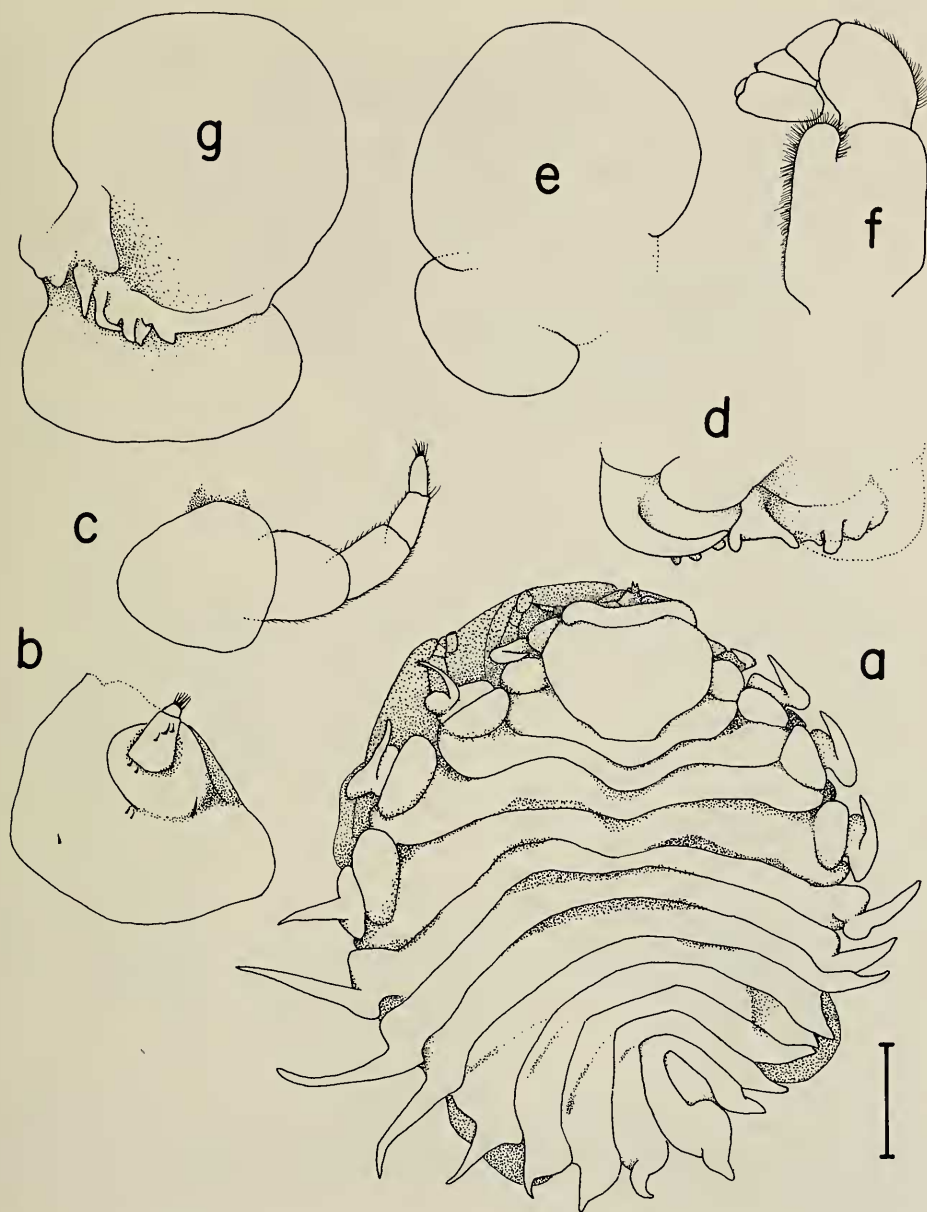


Fig. 1. *Gigantione mortenseni*, female: a, Dorsal view, holotype; b, First antenna (stippled area, point of attachment); c, Second antenna (stippled area, point of attachment); d, Posterior lamina, right maxilliped and spur removed (spur indicated with stippling); e, Maxilliped (setae omitted); f, Pereopod 6; g, Oostegite 1, internal view. Figures from holotype, a, d, g. Figures from USNM 172468, b, c, f. Figure from Nierstrasz and Brender à Brandis specimen ZMC, e. Scale = 2.0 mm.

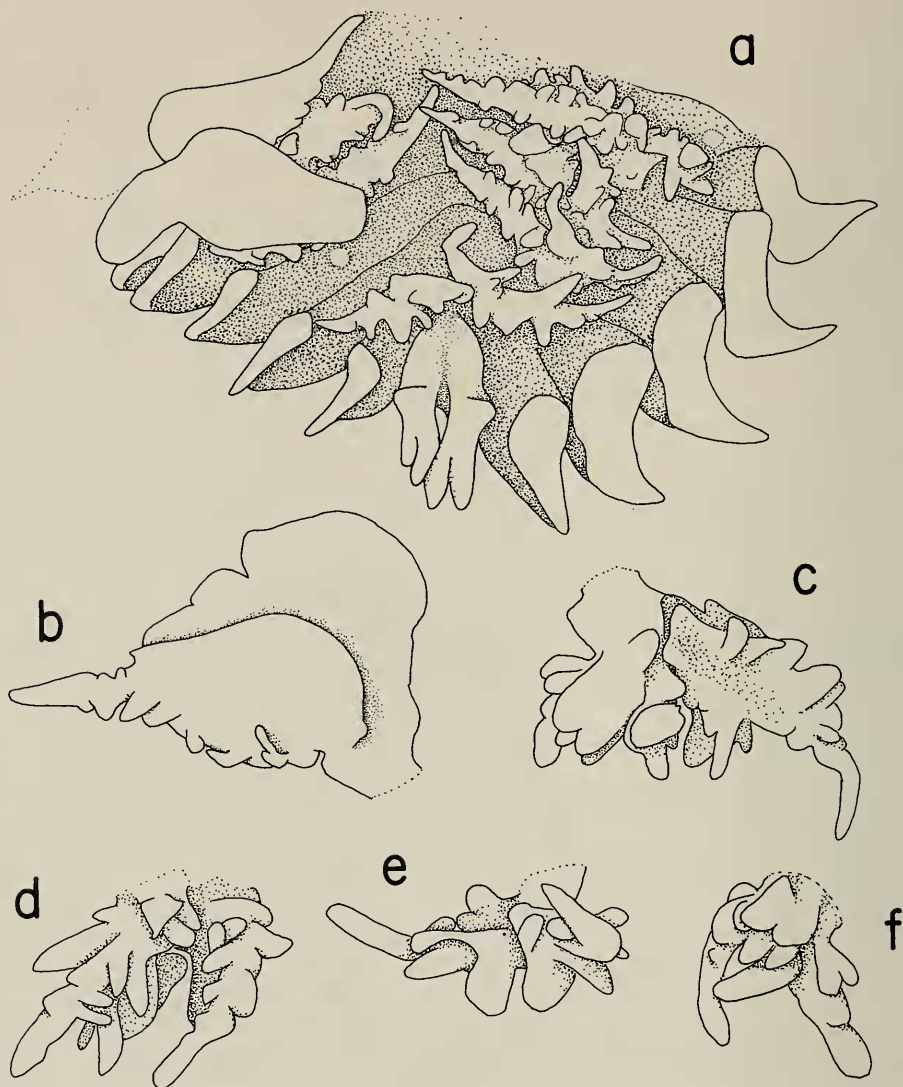


Fig. 2. *Gigantione mortenseni*, female: a, Pleon, ventral view (right pleopod 3 and left pleopod 1 missing); b-f, Pleopod, exopods on right; b, Pleopod 1; c, Pleopod 2; d, Pleopod 3; e, Pleopod 4; f, Pleopod 5. Figure from Nierstrasz and Brender à Brandis specimen ZMC, a. Figures from USNM 172468, b-f.

29°37'N, 80°03'W; capetown dredge; 43 m; Jul 1974; T. S. Hopkins collected; D. L. Adkison determined host; 1 ♀ (juvenile, no male) USNM 172470.—Station 2105; 26°24'N, 83°49'W; capetown dredge; 98 m; 2 Feb 1979; T. S. Hopkins collected; D. L. Adkison determined host; 1 ♀ (juvenile, no male) USNM 172467.

Description.—Female (Figs. 1–4): Mature specimens; length, 5 to 9.5 mm; width across pereomere 4, 5.7 to 8.8 mm; distortion angle 0–30°.

Head wider than long; anterior lamina narrow, laterally expanded into lobes. Eyes often present, visible in anterolateral view. First antenna, segmentation indistinct, 2 to 4 segments, usually 3 segments; basal segment greatly expanded.

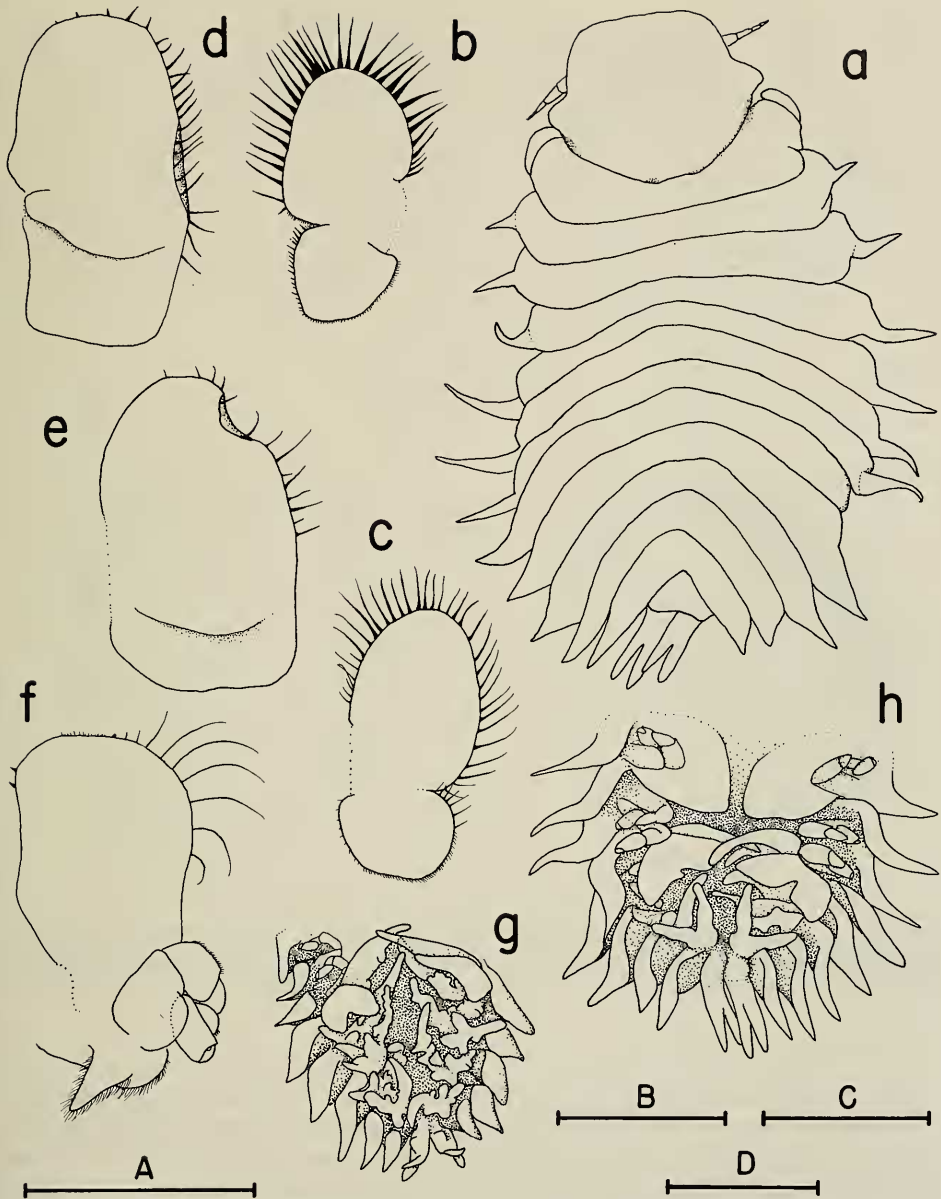


Fig. 3. *Gigantione mortenseni*, immature female; a, Dorsal view; b, Maxilliped; c, Maxilliped; d, Oostegite 1, external view; e, Oostegite 1, internal view; f, Second pereopod, coxal plate and oostegite; g, Pleon, ventral view; h, Pleon of a, ventral view. Figures from USNM 172470, b and g (specimen less mature than USNM 172467). Figures from USNM 172467, a, c–f, h. Scale A = 1.0 mm (Fig. a); B = 0.5 mm (Figs. b–f); C = 1.0 mm (Fig. h); D = 1.0 mm (Fig. g).

Second antenna, 5 or 6 segments; with numerous short setae. Second antenna about twice length of first. Maxilliped fringed with long plumose setae. Posterior lamina margin tuberculate, 1 pair of lateral projections and a median projection with 1 pair of tubercles.

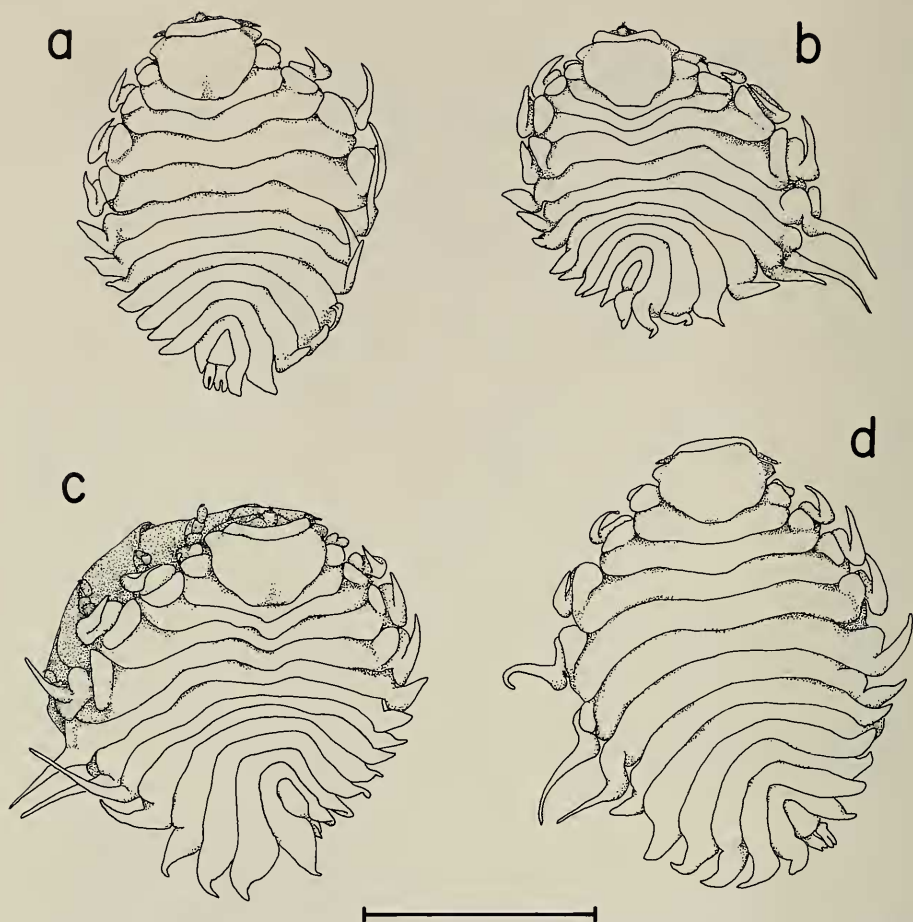


Fig. 4. *Gigantione mortenseni*, variation of female: a, From left gill chamber, USNM 172463; b, From left gill chamber, FSBC I-22929; c, From right gill chamber, USNM 172459; d, From right gill chamber, DISL. Scale = 5.0 mm.

Pereon with dorsal bosses present on pereomeres 1 to 4 and rarely pereomere 5. Coxal plates present on all pereomeres, pubescent; projection elongate, increasing in length posteriorly; on expanded side, coxal plates longer and narrower than on reduced side, coxal plate projection often reduced to small lobe on pereomere 1. First oostegite, posterior plate short, broader than anterior plate; anterior plate with anteromedian edge fringed with short plumose setae, internal ridge with projections on lateral half of ridge. Pereopods of similar size, increasing slightly in size posteriorly, with basal carina.

Pleon of 6 segments, lateral plates on all but pleomere 6; lateral plates pubescent; lateral plates on expanded side with narrow projection similar to that of coxal plates. Pleopods of 5 biramous pairs; first pair much the largest, leaf-shaped, with dorsal margin digitate, exopod wider than endopod. Other pleopods digitate to multilobed often appearing triramous; pleopods decreasing in size posteriorly, endopod longer than exopod. Uropods biramous, rami nearly equal in size, base

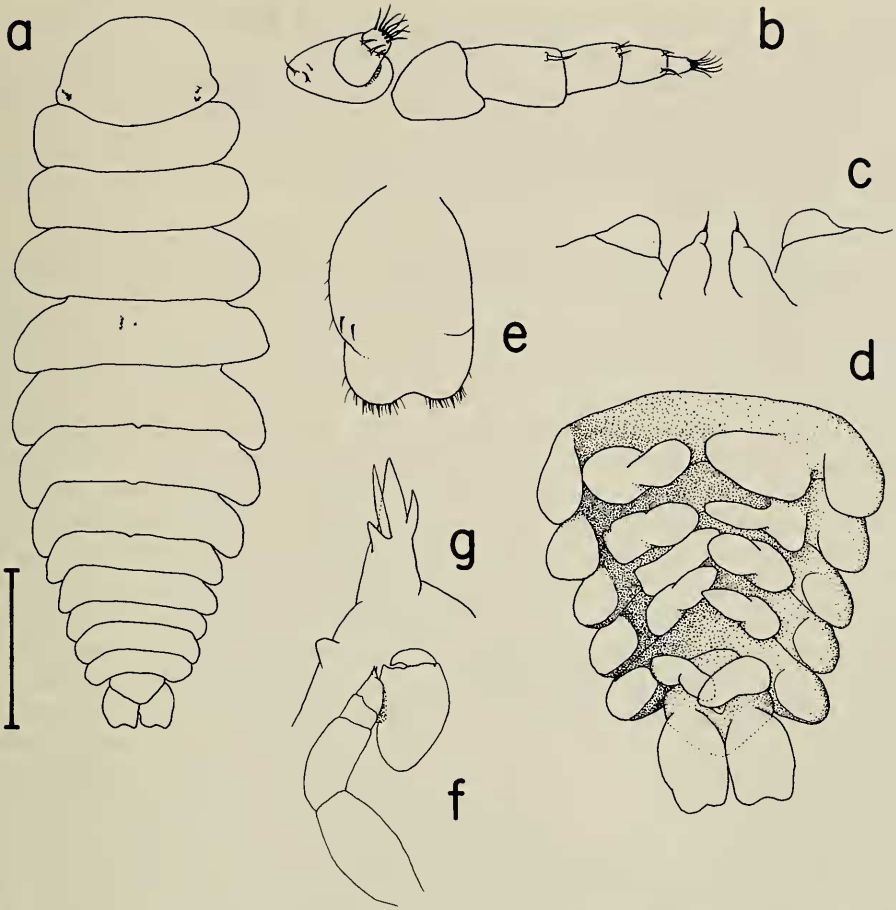


Fig. 5. *Gigantione mortenseni*, male: a, Dorsal view; b, Left antennae; c, Maxillipeds; d, Pleon, ventral view; e, Right uropod; f, Pereopod; g, Complex spine on carpus. Figure from FSBC I-22927, c. Figures from USNM 172468, a, b, d-g. Scale = 0.5 mm.

with prominent tubercle on ventral surface at about point where uropod becomes visible in dorsal view.

Male (Fig. 5): Based on mature specimens; length 2.1 to 2.7 mm, width across pereomere 4, 0.8 to 1.0 mm.

Head, approximately trapezoidal; expanded lobes present at posterolateral corner of head. Eyes present, generally pigmented. First antenna, 3 segments; second antenna, 5 segments; second segment 3 times length of first. Maxillipeds as figured.

Pereomere 1 anterior margin convex; pereomeres 2-4 nearly straight; pereomeres 5-7 progressively directed more posteriorly. Midventral tubercle absent. Pereopods, all of similar size, carpus with a complex spine.

Pleon of 6 segments; all but last with lateral area directed posterolaterally. Midventral tubercles absent. Pleopods, 5 biramous pairs, endopod usually elongate and larger than exopod. Uropods biramous.

Etymology.—This species is named for Dr. Th. Mortensen who collected the first known specimens of the new species.

Distribution.—*Gigantione mortenseni* is known from Haiti, the Virgin Islands, the Gulf of Mexico, and the Atlantic Ocean off Florida.

Discussion.—Nierstrasz and Brender à Brandis, 1931, described and illustrated a pair of bopyrids from *Hypoconcha sabulosa* as *Gigantione bouvieri* Bonnier, 1900, a species known from the xanthid crab, *Pilumnus hirtellus* (L.). Based on the phylogenetic distance between *Hypoconcha* and *Pilumnus*, the forms do not appear to be conspecific.

While Nierstrasz and Brender à Brandis (1931) thought the differences between their specimen and the description of *Gigantione bouvieri* were minor, I believe these differences are specific and differentiate the two species. The differences noted for the female *G. mortenseni* are: (1) the coxal plates are very slender, (2) coxal plates do not cover dorsal bosses, (3) the first pair of pleopods are smaller (though the relative development of the pleopods is age-related to some degree), and (4) the uropods have a basal projection. The differences for the male of *G. mortenseni* are the presence of biramous pleopods and uropods. The complex spine on the pereopods of the male of *G. mortenseni* is unusual and may be a specific character. The pleopods of the female may also be more digitate but this cannot be determined without examination of specimens of *G. bouvieri*. *Gigantione mortenseni* also has a distinct frontal lamina that was not mentioned by either Bonnier (1900) or Nierstrasz and Brender à Brandis (1931), or illustrated by Nierstrasz and Brender à Brandis (1931). Examination of the material of Nierstrasz and Brender à Brandis shows it to have a distinct frontal lamina.

During maturation of the female *G. mortenseni*, projections of coxal plates and lateral plates appear early in development, but the coxal plates and dorsal bosses do not become discrete units until the adult form is nearly attained. The uropods take on the adult form with the basal projection early in development but after the projections on the coxal and lateral plates are present. The relative length of the oostegites and the complexity of the pleopods are the best estimates of maturity. Pleopod 1 becomes larger and broader with age, with the tubercles on the dorsal edge becoming larger and more numerous. Pleopods 2 to 5 become more complex with maturity, being a simple V-shape in the juvenile to complexly tuberculate in the adult and appearing triramous. While the pleopods are becoming more complex, oostegites 2 to 5 are increasing in length. At the simple V-shape stage of the pleopods, the oostegites are small plates that do not reach the midline of the specimen. The oostegites continue to increase in length until in a mature nongravid female the oostegites nearly reach the pereopods of the opposite side. The maturation of the male is not known due to the lack of immature specimens.

The only important variation noted (Fig. 4) for the mature female is a variation in the outline, distortion angle, and development of posterior coxal plates and pleon lateral plates. This variation in gross form does not affect the specific characteristics listed above.

Gigantione uberlackerae, new species

Figs. 6–8

Material examined.—Infesting *Axiopsis* (*Paraxiopsis*) n. sp. Florida Middle-grounds, eastern Gulf of Mexico; Bellows station 21; 28°34'N, 84°17'W; capetown dredge; 30 m; 10 Jul 1977; S. B. Collard and D. L. Adkison collected; B. F.

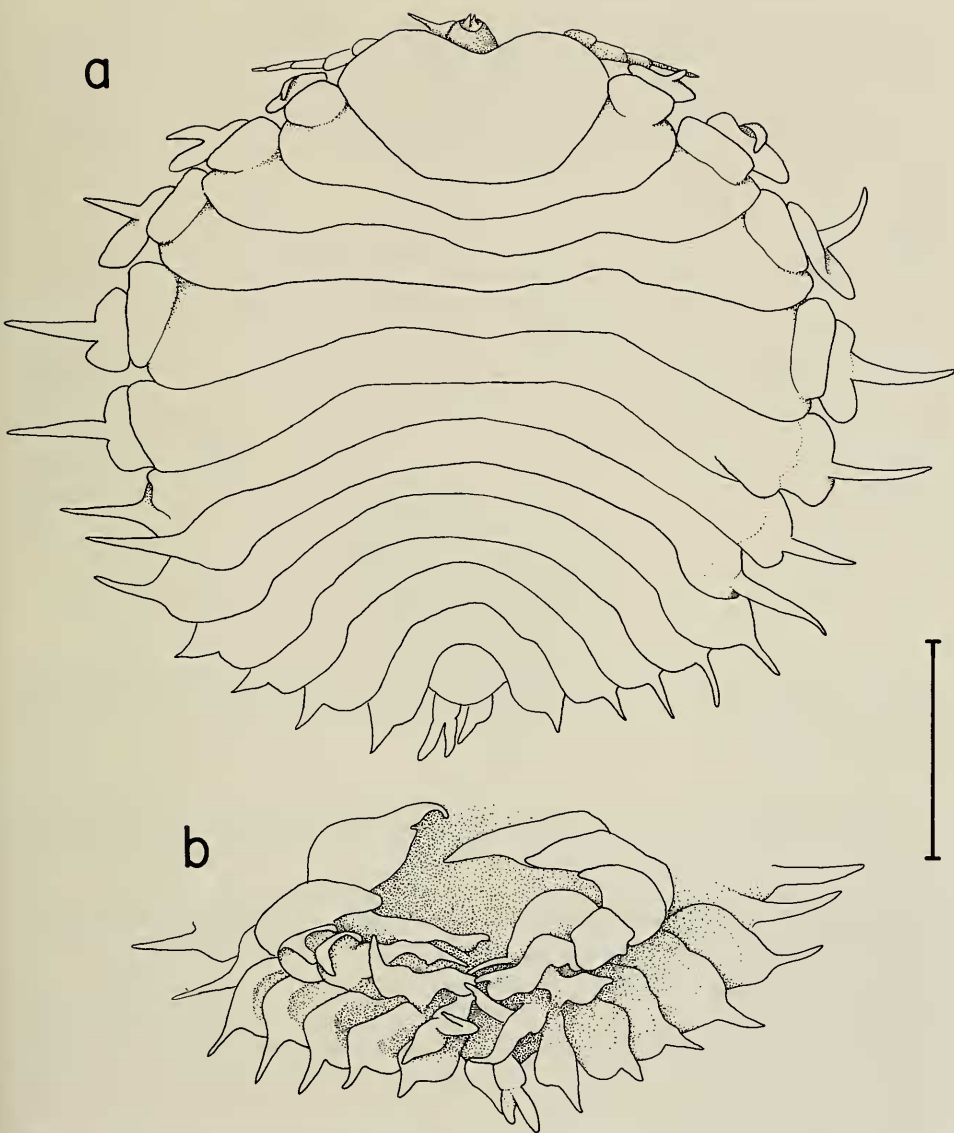


Fig. 6. *Gigantione uberlackerae*, female, holotype: a, Dorsal view; b, Pleon, ventral view. Scale = 2.0 mm.

Kensley determined host; 1 ♀ (non-gravid, holotype) USNM 172449, 1 ♂ USNM 172450 (host USNM 172451).

Description.—Female (Figs. 6 and 7). Length 2.9 mm; width across pereomere 4, 3.2 mm; distortion angle less than 5°; specimen nearly mature, oostegites nearly fully developed.

Head with distinct median notch; anterior lamina reduced; no lateral projections. Eyes absent. First antenna, segmentation indistinct apparently on 5 segments; second antenna, 8 segments; second antenna three times length of first. Maxilliped fringed with plumose setae.

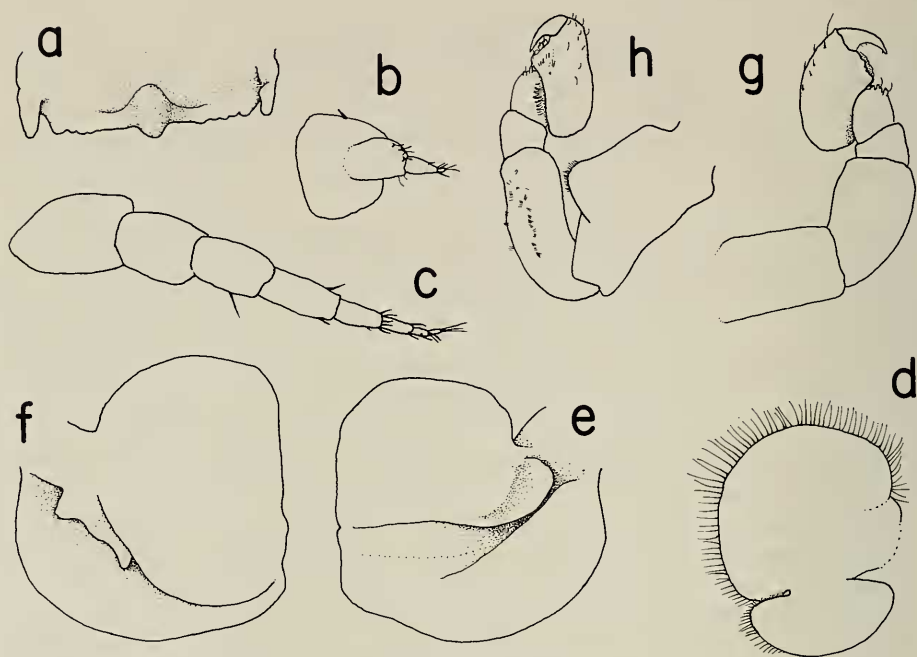


Fig. 7. *Gigantione uberlackerae*, female, holotype: a, Posterior lamina; b, First antenna; c, Second antenna; d, Maxilliped; e, Oostegite 1, external view; f, Oostegite 1, internal view; g, Pereopod 1; h, Pereopod 4.

Pereon with dorsal bosses on pereomeres 1 to 4; coxal plates on all pereomeres pubescent, increasing in length until pereomere 5, thereafter decreasing in length; tergally defined on pereomeres 1 to 5. Pereopods all of similar size, posterior pairs with small basal carinae. First oostegite, posterior plate wider than anterior plate; interior ridge with 2 lateral projections.

Pleomere 1 broader than pereomere 7; lateral plates on pleomeres 1 to 5; pubescent, lateral plates narrower on right side. Pleopods, 5 biramous pairs, first pleopods leaf-shaped, pleopod rami becoming more lanceolate on posterior pairs; margins with only scattered tubercles. Uropods biramous, right uropod without exopod.

Male (Fig. 8): Length 1.7 mm; width across pereomere 3, 0.7 mm.

Head, unpigmented eyes present. First antenna, 4 segments; second antenna, 8 segments; first antenna approximately $\frac{1}{3}$ length of second antenna. Maxillipeds as figured (Fig. 8e).

Pereomeres 5 to 7 with lateral area progressively directed posteriorly. Midventral tubercles absent. Pereopod slightly larger anteriorly.

Pleon decreasing in width posteriorly; pleomere 6 without lateral development, deeply set in pleomere 5. Pleopods, 5 biramous pairs, decreasing in size posteriorly; exopod reduced to lobe. Uropods biramous.

Etymology.—This species is named for Joan Uberlackner, who has found several interesting bopyrids in her studies.

Distribution.—*Gigantione uberlackerae* is known from one pair collected on the Florida Middlegrounds.

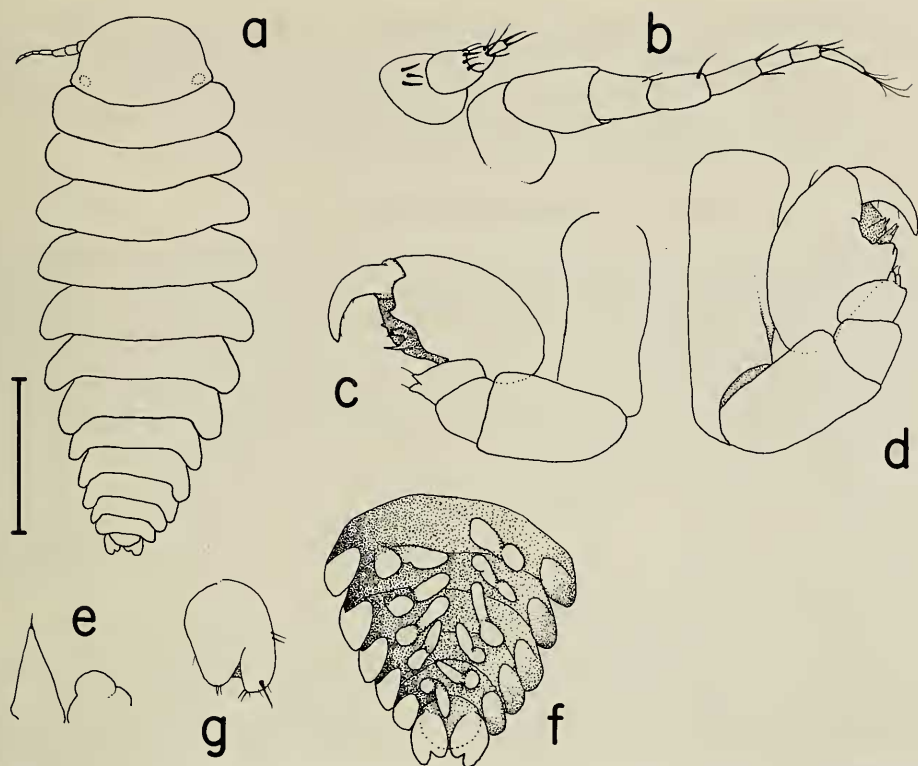


Fig. 8. *Gigantione uberlackerae*, male: a, Dorsal view; b, Antennae; c, Pereopod 1; d, Pereopod 7; e, Left maxillipeds; f, Pleon, ventral view; g, Left uropod. Scale = 0.5 mm.

Discussion.—The female of *Gigantione uberlackerae* n. sp. is distinguished from the nine other members of the genus by: (1) the presence of an anteromedial notch in the head, and (2) the pleopod having few tubercles. Only three species of *Gigantione*: *G. uberlackerae*, *G. rathbunae* Stebbing, 1910, and *G. sagamiensis* Shiino, 1958, do not have lateral projections on the head of the female. The female of *G. rathbunae* differs from the female of *G. uberlackerae* by at least pleopods 2 and 3 being tuberculate. The male of *G. rathbunae* also differs in having uniramous pleopods and uropods. The female of *C. sagamiensis* differs from *G. uberlackerae* by the presence of an enlarged first pleopod, pleopods 2 to 5 having a V-shape with some tubercles, short uropodal rami, and tuberculate lateral plates on the expanded side. The male of *G. sagamiensis* has uniramous uropods.

Gigantione uberlackerae is the first *Gigantione* reported from a non-brachyuran host. It is for this reason that I have decided to describe this species based on only one pair. The holotype is non-ovigerous and may be somewhat immature. Oostegites 2 to 5 overlap those on the opposite side. Based on study of the maturation of *Gigantione mortenseni*, pleopods of the holotype appear to be nearly mature. The first pleopod of *G. uberlackerae* is not enlarged as in the other members of the genus.

The lack of an exopod of the right uropod of the female is the only apparent abnormality noted for *Gigantione uberlackerae*.

The holotypes of both species and several paratypes are deposited in the collection of the Smithsonian Institution (USNM). Paratypes are deposited in collections of the following museums: Universitetets Zoologiske Museum, Copenhagen (ZMC); Rijksmuseum van Natuurlijke Historie, Leiden (RMNHL); and Muséum National d'Histoire Naturelle, Paris (MNHN).

Acknowledgments

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